

CLAIMS

1. An apparatus for aligning and fixing an optical fibre relative to an optical source, comprising:

5 first and second fixing brackets, each fixing bracket including:

a support member for attachment to a substrate;

first and second cantilever arms extending from the support member in opposing directions, each cantilever arm including fibre engagement means for engaging with the optical fibre;

10 the apparatus further comprising a substrate including support means for receiving the support members so as to dispose the first and second fixing brackets such that the fibre engagement means of the first fixing bracket oppose the fibre engagement means of the second fixing bracket, for receiving and supporting an optical fibre therebetween at two
15 longitudinal positions of the optical fibre.

2. The apparatus of claim 1 in which the first and second cantilever arms are of unequal length.

20 3. The apparatus of claim 2 in which the first cantilever arms are at least five times as long as the second cantilever arms.

4. The apparatus of claim 1, claim 2 or claim 3 in which the first and second cantilever arms have different cross-sectional areas.

25 5. The apparatus of claim 4 in which the second cantilever arm has a greater cross-sectional area than the first cantilever arm.

6. The apparatus of any preceding claim in which the cantilever arms have a rectangular cross-section.
7. The apparatus of any preceding claim in which at least one of the 5 cantilever arms has varying cross-sectional area along its length.
8. The apparatus of claim 7 in which the at least one cantilever arm has a tapering cross-sectional area along its length.
- 10 9. The apparatus of claim 7 in which the at least one cantilever arm has a step change in cross-sectional area along its length.
10. The apparatus of claim 1 in which the support members each comprise a channel running therethrough.
- 15 11. The apparatus of claim 10 in which the channel runs substantially orthogonal to an axis extending between the fibre engagement means.
12. The apparatus of claim 10 in which the support means comprise a 20 pair of blocks each adapted to engage with the respective channel of a respective support member.
13. The apparatus of claim 1 in which the fibre engagement means comprises a finger extending laterally from each one of the first and second 25 cantilever arms.
14. The apparatus of claim 13 in which each finger includes an engagement surface for coupling to a wall of the optical fibre.

15. The apparatus of claim 1 in which each of the cantilever arms is plastically deformable.

16. The apparatus of any preceding claim further including an optical fibre positioned between and supported by the fibre engagement means.
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17. The apparatus of claim 16 in which the optical fibre is coupled to an engagement surface of each of the respective fibre engagement means by way of a spot weld.

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18. The apparatus of claim 16 in which the optical fibre includes a sleeve encasing an optical carrier.

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19. The apparatus of any preceding claim further including an optical source fixed directly to the substrate or to an intermediate support means attached to the substrate.

20. The apparatus of claim 1 in which the first and second fixing brackets are formed from a metal suitable for welding.

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21. The apparatus of claim 1 in which the substrate is formed from a metal suitable for welding.

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22. The apparatus of claim 1 in which the support means are formed from a metal suitable for welding.

23. The apparatus of claim 19 in which the optical source is a semiconductor laser diode.

24. An apparatus for supporting and aligning an optical fibre relative to an optical source comprising:
- a fixing bracket, the fixing bracket including:
- a support member for attachment to a substrate; and
- a first relatively long cantilever arm and a second relatively short cantilever arm extending from the support member in opposing directions, each cantilever arm including fibre engagement means for engaging with the optical fibre at different longitudinal positions of the fibre.
- 10 25. The apparatus of claim 24 adapted such that when an optical fibre is supported at two longitudinal positions by said engagement means, an introduced lateral displacement of the first cantilever arm results in an attenuated lateral displacement in the second cantilever arm.
- 15 26. The apparatus of claim 24 or claim 25 further comprising a manipulator to distort the first cantilever arm to induce consequential movement in the second cantilever arm.
27. The apparatus of claim 24 in which the first cantilever arm is at least five times as long as the second cantilever arm.
28. The apparatus of claim 24 or claim 27 in which the first and second cantilever arms have different cross-sectional areas.
- 25 29. The apparatus of claim 27 in which the second cantilever arm has a greater cross-sectional area than the first cantilever arm.

30. The apparatus of claim 24 in which the fibre engagement means comprises a finger extending laterally from each one of the first and second cantilever arms.
- 5 31. The apparatus of claim 24 in which the cantilever arms are plastically deformable.
32. A method for aligning and fixing an optical fibre relative to an optical source, comprising the steps of:
- 10 positioning first and second fixing brackets on a substrate such that first and second fibre engagement means of the first fixing bracket oppose first and second fibre engagement means of the second fixing bracket;
- positioning an optical fibre intermediate the first and second fixing brackets for support therebetween at two longitudinal positions of the fibre;
- 15 securing the first and second fixing brackets to the optical fibre at the points of contact of the fibre engagement means to the fibre; and
- adjusting the fibre alignment relative to the optical source.
33. The method of claim 32 further including the steps of, after
- 20 positioning the optical fibre,
- aligning the fibre to the optical source;
- securing the first and second fixing brackets to support means included on the substrate.
- 25 34. The method of claim 32 or 33 in which the step of adjusting the fibre alignment comprises the steps of:
- distorting a first cantilever arm of each of the first and second fixing brackets;

generating a resultant distortion in a second cantilever arm of each of the first and second fixing brackets in response to the distortion in the first cantilever arm; and

5 correcting the alignment of the optical fibre as a consequence of the cantilever arm distortions.

35. The method of claim 34 in which the first cantilever arm of the first and second fixing brackets is distorted using a manipulator.

10 36. The method of claim 34 in which the second cantilever arm of the first and second fixing brackets responds to the distortion in the first cantilever arm of the first and second fixing brackets through plastic deformation of the support member of the first and second fixing brackets disposed therebetween.

15 37. The method of claim 34 in which the amount of distortional movement of the second cantilever arm of the first and second fixing brackets is attenuated compared to the distortional movement of the first cantilever arm of the first and second fixing bracket.

20 38. The method of claim 34 in which the rigidity of the first cantilever arm along the length of the arm is different to the rigidity of the second cantilever arm along the length of the arm.

25 39. A method of supporting an optical fibre and aligning the optical fibre to an optical source, comprising the steps of:

coupling the optical fibre, at two longitudinally separated positions thereof, respectively to fibre engagement means on each of a first relatively

long cantilever arm and a second relatively short cantilever arm of a fixing bracket;

distorting the first cantilever arm and thereby generating a resultant distortion in the second cantilever arm, thereby adjusting the alignment of
5 the fibre relative to the optical source.

40. The method of claim 39 in which the step of adjusting comprises the application of a distortional force through the use of a manipulator.

10 41. Apparatus substantially as described herein with reference to the accompanying drawings.

42. A method of supporting and aligning an optical fibre substantially described herein with reference to the accompanying drawings.

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